Aeroelastic Uncertainty Analysis Toolbox, Phase II

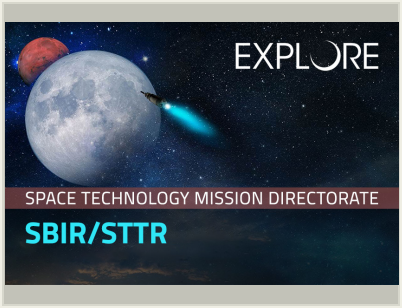
Completed Technology Project (2009 - 2012)

Project Introduction

Flutter is a potentially explosive phenomenon that results from the simultaneous interaction of aerodynamic, structural, and inertial forces. The nature of flutter mandates that flight testing be cautious and conservative.

Anticipated Benefits

NASA is a research leader in aeroelasticity. Recent advances include innovative experimental excitation mechanisms for more accurate vibration data, wavelet analysis for signal processing, stability estimation and nonlinear identification, and robust flutter boundary prediction. The proposed work naturally follows from and compliments these topic areas. The resulting toolbox, STI-ART, will be a valuable asset for the many NASA programs that involve the design, analysis, and test of air vehicles. This is true of both transports and high performance aircraft including those routinely used at NASA DFRC. As part of a research program, all of these aircraft will normally go through analysis, ground loads testing, and flutter testing to ensure safe operations for the given research mission. STI-ART will provide a new means to define the aeroelastic stability flight envelope with greater accuracy to insure safer testing. Furthermore, the toolbox will save analysis time via the more efficient STI also has long standing relationships with numerous manufacturers of both commercial and military aircraft. This places STI in a unique position to demonstrate this product directly to likely potential industry users. STI-ART will benefit both the aeroelastic assessment of commercial transports and military aircraft that routinely operate near or within the critical transonic speed regime. With the many external and internal load configurations and higher g maneuvering envelope of military aircraft, a tool such as STI-ART has the potential to greatly improve the efficiency of the aeroelastic analysis process. Another post application market for the software package is academia, where the toolbox can provide a user friendly environment to evaluate new CFD/FEM modeling techniques. Academic institutions have been, and will continue to be, major players in the development of new methods and modeling techniques. Thus, STI-ART will provide a means to rapidly assess these new methods as th



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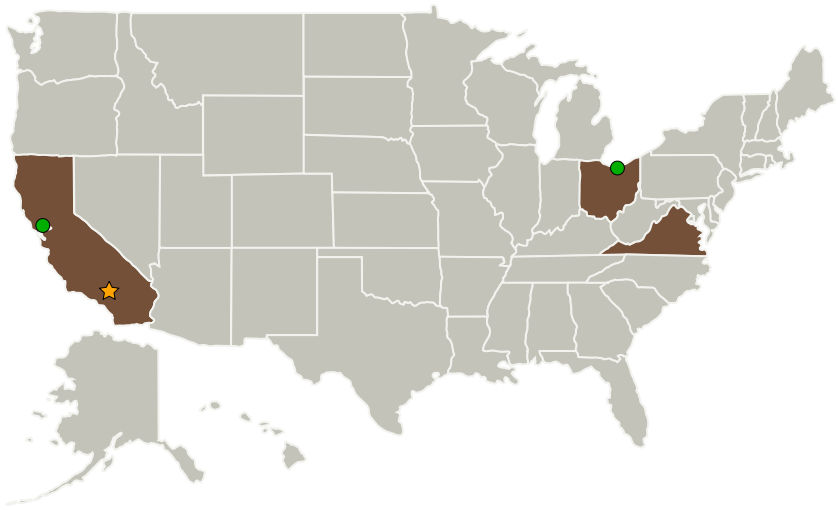
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
●Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California
●Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio
Systems Technology, Inc	Supporting Organization	Industry	

Primary U.S. Work Locations	
California	Ohio
Virginia	

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Manager:

Gary C Jahns

Principal Investigator:

David Klyde

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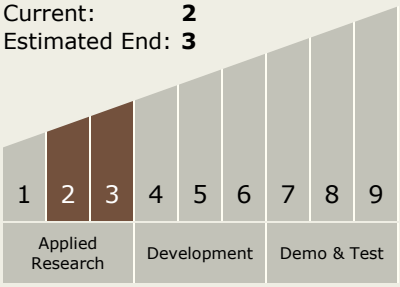
Project Transitions

September 2009: Project Start

March 2012: Closed out

Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **3**



Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.3 Aeroelasticity